PRECISION ELECTRONICS
P.O. Box 842
11084 Newland Street
Broomfield, Colorado 80020
(303) 466-0844

Attn: Charlene McGue

October 21, 1993

Dear Ms. McGue,

Many thanks for sending your EDA magnetometer system to us for inspection - I thought that I'd take advantage of the miracle of FAX machinery to send you my observations, so that they might be passed around the water cooler for everyone's inspection.

I believe that at this time, your EDA gradiometer is delivering a satisfactory level of performance. There's room for just a small amount of improvement through topping up the sensor fluid levels and possibly replacing the somewhat war-torn sensor cable, but otherwise I find the repeatability of readings to be within acceptable limits, and the absolute accuracy (as verified with a test signal source) to be excellent. (Each of five test readings came within $\pm$ 1 gamma of perfection.)

Following this page are two test-run results, the first for Total Field, and the second for Gradient. Both were done with your sensor Bungy-corded to my favorite test tree, and I stood as still as possible while I gathered 20 readings of each type.

The Total Field results are flawed only by higher-than-normal statistical error values. Your unit produced error factors in the .14 to .18 range, where I'm happier when they're lower than .10 - low sensor fluid level (or the need for fresh new fluid) is usually responsible for this.

The gradient readings looked a bit better, with error factors right near the .10 level, and gradient readings which varied from the median value of 14.2 by only $\pm$.9 gamma.

As I skim through the wad of data that you sent me, I see generally nice, low error factors, with just an occasional high one. These occasional high errors could be due to the presence of a lot of metallic junky clutter underfoot, or by the operator allowing the sensor to wiggle and jiggle around while the reading is being taken.

Currently I'm examining the cartridge-type battery pack - while the blue battery belt was capable of thousands of auto cycle readings, the little cartridge dropped dead after approx. 200. I'm trying a "home remedy" on it right now, which consists of deep-draining the pack with a resistor load, followed by a long, slow recharge. This procedure often restores the operating capacity to these battery packs - if it doesn't do the trick, we'll need to replace the cells within the pack.

As far as costs of doing this stuff goes, we're looking at somewhere between $150 and $250 to fix up the sensor (new fluid and cable), examine the interior of the console including the test & possible replacement of the little Lithium "memory" battery that lives inside, and check out and adjust the battery charger. If we need to replace the batteries within the cartridge, then we'll wind up toward the high end of that range - if the old cells revive properly, then we'll be at the low end. (Return shipping, of course, is additional, and can be charged to WW's Federal Express number.)

Let me know if you'd like me to press onward with the maintenance work - if you want to send me your heroic thoughts through the fax machine, it's best to call ahead, because the fax machine is usually turned off.

Best Regards and All That Stuff,

Win

Winfield Kindel

Total field test, with sensor mounted to a tree trunk.


```
EDA  OMNI-1V  Tie-line  MAG  Ser #255219
TOTAL FIELD DATA (uncorrected)
Date: 21 OCT 93
Operator:  3000
Reference field: 54000.0
Datum subtracted: 54000.0
Records:   20
Bat:  17.3 Volt     Lithium:  3.50 Volt
Last time update: 10/21 11:21:00
Start of print: 10/21 11:33:43

    #1     -262.1  .16      0.0 11:23:02 88
    #2     -262.1  .16      0.0 11:23:17 88
    #3     -261.8  .16      0.0 11:23:23 88
    #4     -261.6  .15      0.0 11:23:29 88
    #5     -261.8  .17      0.0 11:23:35 88
    #6     -261.6  .16      0.0 11:23:41 88
    #7     -261.2  .16      0.0 11:23:48 88
    #8     -261.4  .15      0.0 11:23:53 88
    #9     -261.8  .16      0.0 11:24:00 88
   #10     -261.9  .15      0.0 11:24:05 88
   #11     -262.1  .16      0.0 11:24:10 88
   #12     -261.9  .15      0.0 11:24:16 88
   #13     -262.3  .15      0.0 11:24:21 88
   #14     -261.5  .16      0.0 11:24:27 88
   #15     -261.8  .15      0.0 11:24:32 88
   #16     -261.9  .17      0.0 11:24:38 88
   #17     -261.8  .18      0.0 11:24:44 88
   #18     -261.7  .16      0.0 11:24:49 88
   #19     -262.3  .16      0.0 11:24:55 88
   #20     -262.0  .15      0.0 11:25:00 88
```

These total field values are looking pretty reasonable, though they could probably be improved just a tad with some sensor maintenance.

These error values are a bit higher than is desireable, probably due to the need for sensor maintenance (fluid refill, possible new cable).

Gradient reading test, same tree trunk.

Page 4 of 9

```
EDA  OMNI-IV  Tie-line  MAG  Ser #255219
TOTAL FIELD DATA (uncorrected)
& GRADIENT
Date: 21 OCT 93
Operator:  5000
Reference field: 54000.0
Datum subtracted: 53800.0
Records:   20
Bat:  16.7 Volt     Lithium:  3.50 Volt
Last time update:  0/8:  0:7>:00
Start  of  print: 10/21 12:28:22

   #1     -141.4  .09      0.0 12:21:10 88
            14.2
   #2     -143.1  .11      0.0 12:21:31 88
            13.7
   #3     -141.9  .10      0.0 12:21:42 88
            14.1
   #4     -141.4  .10      0.0 12:21:53 88
            14.5
   #5     -141.3  .10      0.0 12:22:04 88
            14.4
   #6     -141.3  .09      0.0 12:22:12 88
            14.3
   #7     -141.6  .10      0.0 12:22:21 88
            14.9
   #8     -141.0  .10      0.0 12:22:27 88
            13.6
   #9     -141.0  .10      0.0 12:22:34 88
            13.7
  #10      141.2  .10      0.0 12:22:42 88
            14.1
  #11     -141.3  .11      0.0 12:22:49 88
            13.8
  #12     -141.4  .11      0.0 12:22:56 00
            15.7
  #13     -141.0  .10      0.0 12:23:02 88
            13.4
  #14     -140.8  .10      0.0 12:23:09 88
            13.3 -low
  #15     -141.1  .11      0.0 12:23:19 88
            13.5
  #16  ?  (-152.2) .10      0.0 12:23:26 88
            14.0
  #17     -141.5  .10      0.0 12:23:32 00
            14.6
  #18     -141.7  .11      0.0 12:23:38 88
            15.1 -high
  #19     -141.3  .10      0.0 12:23:45 88
            14.2
  #20     -141.3  .12      0.0 12:23:50 88
            14.4

EOF
```

"Decay" and "sensor" values look good all the way through.

Gradient readings varied from 13.3 to 15.1 with sensor completely stationary. This isn't terrible, but could probably be improved by making the sensor happy again.

these error factors look better than the total-field-only values.